

We claim:

- 1 1. A device for controlling processing of data elements, in which a thread is  
2 assigned to each data element and no more than one data element enters the  
3 device at one time, comprising:
  - 4 - a first unit, in which the context for each thread is entered, and which  
5 fetches an instruction during a first clock cycle that is entered in the context of  
6 the thread assigned to the incoming data element,
  - 7 - a second unit, which, during a second clock cycle, fetches an  
8 instruction, which succeeds a stipulated instruction in the sequence of  
9 instructions of a stipulated thread, and
  - 10 - a third unit, which, during the second clock cycle, decodes the  
11 instruction that is provided for processing of the data element and fetches a  
12 control signal for processing of the data element.
- 1 2. The device according to Claim 1, wherein
  - 2 - the instruction fetched by the second unit is the instruction, whose  
3 position in the sequence of instructions of the stipulated thread, is the  
4 increment of the position of the stipulated instruction.
- 1 3. The device according to Claim 2, wherein
  - 2 - the second unit is fed with the increment of a count value and an  
3 identification value, which designates a thread, and
  - 4 - the second unit, by means of the increment and the identification value,  
5 determines the instruction which assumes in the thread designated by the  
6 identification value the position designated by the increment assumes.
- 1 4. The device according to Claim 1, wherein
  - 2 - the first unit activates the context of the thread assigned to the  
3 incoming data element, if the preceding data element refers to another thread.

- 1    5.    The device according to Claim 4, wherein  
2        -        the first unit fetches an instruction of the thread stated in the activated  
3        context and transmits this instruction, which is the first instruction of the  
4        thread, in particular, to the third unit for decoding,  
5        -        the first unit transmits the increment of the position that the instruction  
6        fetched by it assumes in the thread, to the second unit.
- 1    6.    The device according to Claim 3, wherein  
2        -        the second unit determines the instruction that succeeds the instruction  
3        fetched by the first unit in the thread.
- 1    7.    The device according to Claim 1, wherein  
2        -        for data elements entering the device in succession, the same thread is  
3        assigned, as long as the same instruction is used, until a stipulated condition is  
4        met.
- 1    8.    The device according to Claim 7, wherein  
2        -        repetition of an instruction is accomplished by the fetching of the same  
3        control signal by the third unit.
- 1    9.    The device according to Claim 7, wherein  
2        -        the number of repetitions of an instruction is stipulated by a value,  
3        -        this value, during a repetition of the instruction, is decremented by the  
4        third unit, and  
5        -        the repetitions are interrupted at the value 0.
- 1    10.   The device according to Claim 7, wherein  
2        -        after fulfillment of the stipulated condition for processing of the data  
3        element entering the device next, a stipulated instruction within the thread is  
4        used, if the same thread is assigned to this data element.

- 1 11. The device according to Claim 10, wherein  
2 - the inquiry into fulfillment of the stipulated condition occurs in the  
3 third unit.
- 1 12. The device according to Claim 10, wherein  
2 - the stipulated instruction is the instruction fetched by the second unit.
- 1 13. The device according to Claim 12, further comprising:  
2 - a connection line for data transmission between the second unit and the  
3 third unit, through which the instruction, fetched by the second unit is  
4 transmitted to the third unit.
- 1 14. The device according to Claim 12, wherein  
2 - the instruction fetched by the second unit is transmitted to the first unit  
3 and entered in the context there.
- 1 15. The device according to Claim 10, wherein  
2 - the stipulated instruction is fetched by the first unit and transmitted to  
3 the third unit for decoding.
- 1 16. The device according to Claim 11, wherein  
2 - the third unit, after fulfillment of the stipulated condition, transmits an  
3 instruction to the first unit as to which instruction is to be fetched.
- 1 17. The device according to Claim 10, wherein  
2 - the stipulated condition, whose fulfillment leads to interruption of  
3 repetitions of an instruction, is fulfilled by a signal controllable from outside of  
4 device, or by a specific data element entering the device, or by a specific state  
5 of the corresponding thread, or by a specific instruction to be processed.

- 1    18.    The device according to Claim 7, further comprising:  
2           -        a program memory, in which the instructions for processing of the data  
3           elements are entered, and in which information is entered for each instruction  
4           on how many data elements the instruction is to be applied, wherein the  
5           program memory has program lines, in particular, in which one instruction and  
6           the corresponding information, with reference to the number of repetitions, are  
7           entered.
- 1    19.    The device according to Claim 1, further comprising:  
2           -        two series-connected delay units that delay the data element by one  
3           clock cycle each.

1   20.   A method for controlling processing of data elements, comprising the steps of:  
2       - assigning a thread to each data element and no more than one data element  
3       enters the device at one time,  
4       -       fetching an instruction in a first unit during a first clock cycle that is  
5       entered in the context of the thread assigned to the incoming data element,  
6       -       fetching an instruction in a second unit, which succeeds a stipulated  
7       instruction in the sequence of instructions of a stipulated thread, and  
8       -       decoding the instruction that is provided for processing of the data  
9       element and fetching a control signal for processing of the data element in a  
10      third unit.

1   21.   The method according to Claim 20, wherein  
2       -       the instruction which succeeds the stipulated instruction is the  
3       instruction, whose position in the sequence of instructions of the stipulated  
4       thread, is the increment of the position of the stipulated instruction.

1   22.   The method according to Claim 21, further comprising the step of:  
2       -       feeding the second unit with the increment of a count value and an  
3       identification value, which designates a thread, and  
4       -       the second unit, by means of the increment and the identification value,  
5       determines the instruction which in the thread designated by the identification  
6       value assumes the position designated by the increment .

1   23.   The method according to Claim 20, further comprising the step of:  
2       -       activating the context of the thread assigned to the incoming data  
3       element by the first unit, if the preceding data element refers to another thread.

- 1    24.    The method according to Claim 23, further comprising the step of:  
2            -        fetching an instruction of the thread stated in the activated context and  
3            transmitting this instruction by the first unit, which is the first instruction of the  
4            thread, in particular, to the third unit for decoding,  
5            -        transmitting the increment of the position that the instruction fetched by  
6            it assumes in the thread, to the second unit.
- 1    25.    The method according to Claim 22, further comprising the step of:  
2            -        determining the instruction that succeeds the instruction fetched by the  
3            first unit in the thread.
- 1    26.    The method according to Claim 20, further comprising the step of:  
2            -        assigning the same thread for data elements entering in succession as  
3            long as the same instruction is used, until a stipulated condition is met.
- 1    27.    The method according to Claim 26, wherein  
2            -        repetition of an instruction is accomplished by the fetching of the same  
3            control signal by the third unit.
- 1    28.    The method according to Claim 26, wherein  
2            -        the number of repetitions of an instruction is stipulated by a value,  
3            -        this value, during a repetition of the instruction, is decremented by the  
4            third unit, and  
5            -        the repetitions are interrupted at the value 0.
- 1    29.    The method according to Claim 26, wherein  
2            -        after fulfillment of the stipulated condition for processing of the data  
3            element entering the device next, a stipulated instruction within the thread is  
4            used, if the same thread is assigned to this data element.

- 1    30.    The method according to Claim 29, wherein  
2           -        the inquiry into fulfillment of the stipulated condition occurs in the  
3           third unit.
- 1    31.    The method according to Claim 29, wherein  
2           -        the stipulated instruction is the instruction fetched by the second unit.
- 1    32.    The method according to Claim 30, wherein  
2           -        the instruction fetched by the second unit is transmitted to the first unit  
3           and entered in the context there.
- 1    33.    The method according to Claim 29, wherein  
2           -        the stipulated instruction is fetched by the first unit and transmitted to  
3           the third unit for decoding.
- 1    34.    The method according to Claim 30, further comprising the step of:  
2           -        after fulfillment of the stipulated condition, transmitting an instruction  
3           by the third unit to the first unit as to which instruction is to be fetched.
- 1    35.    The method according to Claim 29, wherein  
2           -        the stipulated condition, whose fulfillment leads to interruption of  
3           repetitions of an instruction, is fulfilled by a signal controllable from outside of  
4           device, or by a specific data element entering the device, or by a specific state  
5           of the corresponding thread, or by a specific instruction to be processed.
- 1    36.    The method according to Claim 26, further comprising the steps of :  
2           -        entering the instructions for processing of the data elements into a  
3           program memory, wherein information is entered for each instruction on how  
4           many data elements the instruction is to be applied, wherein the program  
5           memory has program lines, in particular, in which one instruction and the  
6           corresponding information, with reference to the number of repetitions, are  
7           entered.

- 1 37. The method according to Claim 20, further comprising the step of :
- 2 - delaying the data element by two clock cycles.